

REMARKS

Claims 1-10 are pending and claim 1 is independent. Claim 1 is amended to change the term “derivative” to “compound” as recommended by the Examiner. Thus, no new matter is added.

Reconsideration and withdrawal of the outstanding rejections are respectfully requested.

Issue under 35 U.S.C. § 112, second paragraph

The Examiner has rejected claims 1-10 under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. This rejection is respectfully traversed and rendered moot by the amendment to claim 1.

Issue under 35 U.S.C. § 103(a)

The Examiner has rejected claims 1-10 under 35 U.S.C. § 103(a) as being obvious over Shetty (USP 6,699,989, hereinafter Shetty) in view of DN 106:18399, Chu et al. abstract (1986), DN104:129888, Narita et al. abstract (1985) and DN 128:321632, Antons et al. abstract (1997). This rejection is respectfully traversed.

Claim 1 is directed to a process for 1,8-naphthyridine-3-carboxylic acid compound comprising the four steps a)-d), which is characterized by a one pot operation of the steps using a single solvent system without intermediate isolation.

However, the cited art does not disclose or suggest the claimed features of “a one pot operation using a single solvent system without intermediate isolation”.

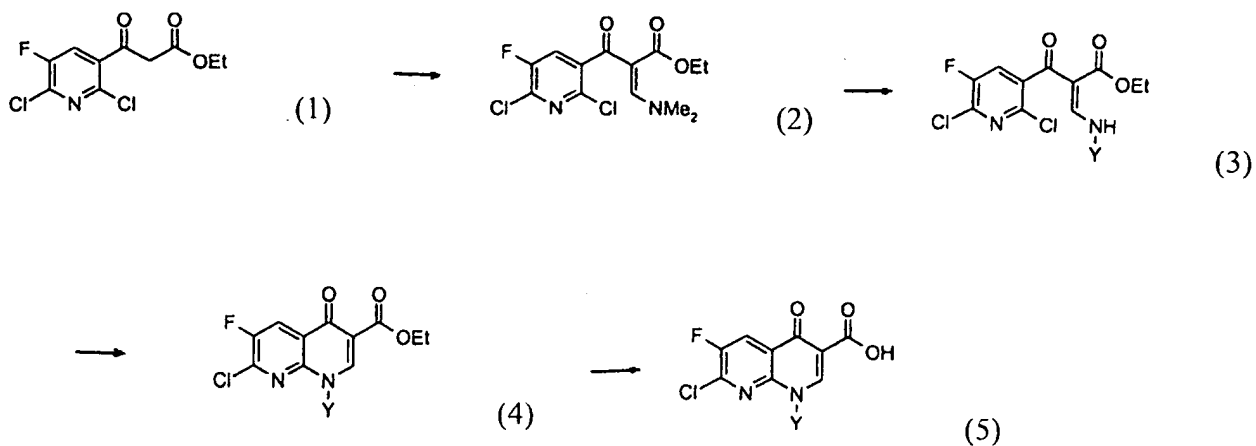
Specifically, Shetty completely fails to disclose or suggest the claimed features. In Shetty, the processes of distillation under reduced pressure and evaporation are necessary in the work-up steps to remove the solvents, and two or more solvents are employed to produce a final product.

In contrast, the present invention does not require the processes of distillation under reduced pressure and evaporation due to the present "one pot operation". Accordingly, the present invention does not produce waste solvents during the work-up steps, and thus, a pure product can be obtained by merely following the claimed steps (a)-(d). Also, the final product of the present invention is obtained by using a single solvent system (see: Examples 1 to 3 of the present specification).

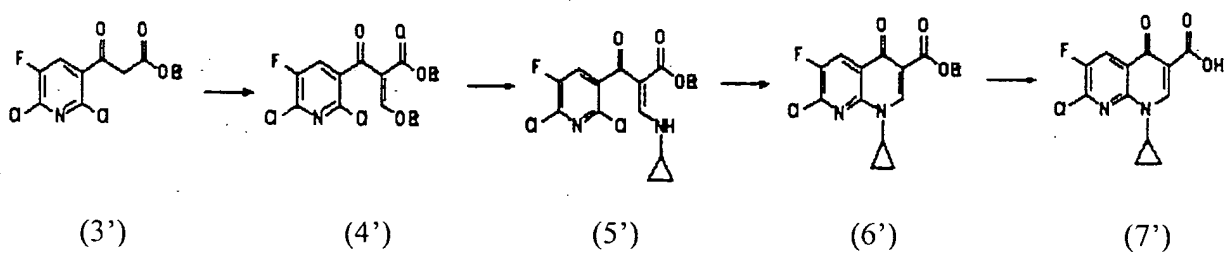
The one-pot operation used in the present invention is a strategy to improve the efficiency of a chemical reaction whereby a reactant is subjected to successive chemical reactions in just one reactor. This is much desired by chemists because the claimed process eliminates the lengthy separation process and purification of the intermediate chemical compounds, and thus saves time and resources while increasing chemical yield. However, Shetty fails to disclose or suggest such a one pot operation using a single solvent system without intermediate isolation as recited in present claim 1.

Below is illustrated the difference between the present method and Shetty's method in more detail:

(A) The present process of claim 1:



(B) Shetty process (see columns 22-24 of Shetty)



(C) Comparison

The Present Invention (1)→(2)	Shetty (3')→(4')	Difference
To a solution of compound (1) in toluene is added dimethylformamide dimethylacetal and acetic acid at room temperature. The mixture is stirred at room temperature for 30 minutes (see Example 1)	A mixture of triethylorthoformate and acetic anhydride is added, refluxed for 6 hrs, and then is distilled under reduced pressure (see column 24, lines 5-9)	<ul style="list-style-type: none"> • The products are different • The present method does not need a distillation process to conduct the next step
The Present Invention (2)→(3)	Shetty (4')→(5')	Difference
Cyclopropylamine is added thereto, the mixture is stirred for 30 minutes, and is washed with 10% aqueous citric acid (see Example 1)	To a solution of (4') in MDC (methylene chloride), cyclopropylamine is added with cooling below 10°C, and the mixture is stirred at room temperature for 1 hour and evaporated to a dry mixture (see column 24, lines 15-32)	<ul style="list-style-type: none"> • The starting materials are different • The claimed method uses the same solvent (e.g., toluene) which is used in the previous step, whereas Shetty uses a new solvent MDC, and evaporation step is necessary to eliminate MDC
The Present Invention (3)→(4)	Shetty (5')→(6')	Difference
25% aqueous tetrabutylammonium hydroxide solution (or catalytic bromide and 25% NaOH) is used as a base (see Example 1)	To the dry mixture in dimethoxyethane, 60% sodium hydride-in-oil (as a base) is added with cooling and stirring, the precipitate is filtered and washed with water and dried (see column 24, lines 15-32)	<ul style="list-style-type: none"> • The kind of base used in the process is different • The present method uses the same solvent (e.g., toluene) which is used in the previous step, and filtration process is not necessary. Also, the resulting solution is continuously used in the next step. • Shetty uses a different solvent from that used in the previous step, and filtration process is necessary

The Present Invention (4)→ (5)	Shetty (6')→ (7')	Difference
Concentrated HCl is added to the reaction solution, and the mixture is heated under reflux for 8 hours, then cooled, filtered to give the title compound (see Example 2)	THF and aqueous NaOH solution are added and the mixture is refluxed for 2 hours. The product is cooled and acidified with acetic acid and the precipitate is filtered to obtain the title compound (see column 24, lines 15-32)	<ul style="list-style-type: none">• The present method is hydrolysis under acidic condition whereas Shetty is that under basic condition• The claimed method uses the same solvent(toluene) which is used in the previous step, however Shetty uses a different solvent (THF) from that used in the previous step

As discussed above, the present invention is patentably distinct from Shetty in that the present method employs a one pot operation using a single solvent system. Further, the deficiencies of Shetty cannot be cured by the secondary references, Chu et al., Narita et al. and Antons et al. because they also fail to disclose or suggest the claimed features.

As the MPEP directs, all the claim limitations must be taught or suggested by the prior art to establish a *prima facie* case of obviousness. See MPEP § 2143.03. In view of the fact that the cited references fail to disclose or fairly suggest a one pot operation using a single solvent system without intermediate isolation, a *prima facie* case of cannot be said to exist.

In light of the above remarks, since independent claim 1 is believed to overcome the 35 U.S.C. § 103(a) rejections, the dependent claims therefrom are also believed to address the same rejection. Therefore, the Examiner is respectfully requested to withdraw this rejection.

In view of the above amendment, Applicants believe the pending application is in condition for allowance.


Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Craig A. McRobbie Reg. No.

42,874 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.147; particularly, extension of time fees.

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Respectfully submitted,

By 

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